

A DIETARY STUDY OF ELEVEN  
FITTER FAMILIES OF KANSAS

by

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## INTRODUCTION

Each fall at the Kansas Free Fair at Topeka, Kansas, a clinic is held to which any Kansas family desiring it may come to be scored as to mental and physical fitness. This movement was originated in 1920 by Mrs. Mary T. Watts of Audubon, Iowa, and Dr. Florence Brown Sherbon of the University of Kansas, in cooperation with the Secretary of the Kansas Free Fair. Since that time this event, still sponsored by Dr. Sherbon, has been an annual affair conducted as a Eugenics Department by the Bureau of Child Research of the University of Kansas. It is designed to create interest and develop pride in health. Further interest is secured by awarding trophies, medals, and certificates to those families and individuals receiving highest scores. To the groups so honored is given the title of the Fitter Families of Kansas.

Since these people have thus been shown to possess superior physical and mental ability it was thought it might be of value to know something of their food habits, as diet is believed to contribute to general well-being. A dietary study was therefore made of eleven of these Fitter Families.

## WORK IN THE FIELD

The interest in nutrition is of comparatively recent

origin. In our own country a definite program to improve it has developed largely within the last twenty-five years and the dietary study has been used as a means to this end. The earliest quantitative dietary studies in the United States were made by W. O. Atwater (6). During the twenty years extending from 1886 to 1906, he and his cooperators in various states collected and analyzed data concerning the food habits of 298 working men's families living in 14 different states. In these early studies cost and its relationship to fuel value and protein seemed to be the factors most stressed. Later dietary studies made by Sherman and Gillett (6) in 1914 included 92 families living in New York City, Ohio, Connecticut, and California. In addition to energy, protein, and cost, these diets were also analyzed for calcium, phosphorus, and iron.

In 1915 Gephart (5), upon special request, studied the diets at St. Paul's School at Concord, N. H., noting the fat, protein, and total energy of the food consumed. At the time this study was made, however, the importance of minerals and vitamins was not widely recognized so they were not included. Again in 1926-1927 the St. Paul's School checked upon its food habits with the help of Hawley of the Bureau of Home Economics of the United States Department of Agriculture (5). She found, as did Gephart, that these boys consumed unexpectedly large quantities of food. On the



average, these amounted to 31% more energy, 66% more protein, 60% more calcium, 33% more phosphorus, and 20% more iron than the estimated needs of such boys, according to the usual standards. The boys at this school were slightly taller than the average American boy but were of normal weight which supports the conclusion that the food the boys consumed probably met their needs.

Because of interest in reported changes in what constitutes an adequate diet, Gillett and Rice in 1928 considered it desirable to repeat the New York portion of the work done in 1914 (3). As in the earlier study it was planned to include families which had received no food education as well as those which had been consciously influenced by intensive food education. The most common errors found in the 1914 study among the uninfluenced families were too much meat and fish and too little use of milk, fruits, and vegetables. In the later study the uninfluenced families spent a larger amount of their food money for milk, fruit, and vegetables with a corresponding decrease in that spent for meat and fish than did the uninfluenced families in the earlier study. In both cases, the families which had received food education distributed their money in such a way as to obtain diets of higher food value at less cost than did the families which had received no food education. The influenced families of 1928 spent their money as was sug-

gested as the result of the 1914 study. These workers report "The average family spent more for milk and cheese and practically as much for fruits and vegetables as for meat, fish, and eggs."

Phillips and Howell (10), in studying foreign families in New York City, also found improvement resulting from instruction in the home whereby mothers had an opportunity to learn how to adjust themselves to their circumstances. They concluded that it was a wiser plan to spend money for instruction of the mother than to spend it later for charity, doctor's bills, punishment for crime, and for the education and care of mental defectives.

A study by McLaughlin et al (8) on the use of vegetables in the diets of preschool children, suggests the change, which has occurred in the American dietary within the last few years. They call attention to the fact that only as far back as 1911 Griffith advised that the child from three to six years of age be given parsnips, carrots, turnips, stewed tomatoes, and squash with discretion. He also advised against the use of any cabbage, raw celery, cauliflower and raw tomatoes. Most of these vegetables are now used commonly in the child's diet. These authors found the children they were studying were receiving more than two servings of such vegetables a day in addition to one of potatoes. Nine or more different vegetables were served

each week.

Hawks (4), in a study of Chinese-American children revealed the fact that the Chinese children living in this country were small for their ages according to American standards, yet they surpassed the average child in this respect living in China. She says, "As would be expected, many of the characteristics of the diets used in China have been retained in these American homes. The chief modifications are the inclusion of some milk and the substituting of bread for a portion of their rice. Vegetables were probably used less and meat perhaps more than in the reported diets of the middle class."

A study was made by Roberts in Gary, Indiana, (12) under the auspices of the Children's Bureau of the United States Department of Labor whereby she found that the large majority of the children observed were not being adequately fed, when judged by the usually accepted nutrition standards. The small amount of milk in the diets was believed to be chiefly responsible for so large a percentage of inadequacy. Only 18.9% of all the children were receiving the pint of milk generally recognized as the minimum amount necessary for adequate calcium while 57.2% received no milk.

Another similar study by the same author (13) made in a mountain county of Kentucky revealed somewhat similar results. Only 28% of the children were receiving diets which

were probably adequate for health. The diets of 27% were obviously inadequate for the needs of growing children. Fruits and vegetables occupied a minor place in these diets. Eggs were almost entirely lacking. According to Roberts, "Milk and whole corn meal were the redeeming features of the diet, but in many homes even the supply of milk was too limited."

The food consumption of rural school children in relation to their health was studied by Davies (2) in 1927. She concluded as a result of this study that "the house wives, chiefly through lack of knowledge of even the simplest principles of good nutrition, do not make provision for meeting the food requirements of growing children. The meals were planned almost solely from the point of view of the tastes of the adult members of the household, and the children had free access to anything on the family table." The good quality of the teeth of the children in one group, when compared with those in another in this study, was believed to have been due to the difference in milk consumption between the two groups. No other factor could be found to explain this difference.

The relationship between dietary habits and health has also been studied by Reynolds (11). In her investigation of the dietaries of 576 native white children in Virginia it was found that the food of only 18% of all the school chil-



dren could be regarded as adequate when judged by accepted nutrition standards which stressed such "protective foods" as milk, green leafy vegetables, and fruits. The diets of 72% of the white children were questionable because of the small amount of the above foods used, while 10% of this same group were decidedly poor since they were composed largely of cured meat, corn bread, potatoes, hominy grits, or other refined cereals. Only small amounts of fresh fruits were used in the summer months. These were replaced in the winter by limited quantities of dried fruits or preserves. Coffee was used in the place of milk.

The diet of the negro mother in New York City studied by Hess and Unger (7) is interesting since it shows how inadequate a diet may be due to the lack of "protective foods" and the effect this may have upon the health of the child. It was found that these women received an excess of protein, adequate carbohydrate, but a 25% deficiency in fat. Milk, fruit, and fresh vegetables were rarely included in their diets.

A study made by Muse and Gillum (9) of fifty Vermont farm households is a little more favorable than the previous ones cited. The work showed that on a whole that the fifty diets were adequate in the five factors studied, i.e., Calories, protein, calcium, phosphorus, and iron, they state that "calcium needs were satisfied first, and that a

detailed study of calcium relative to the milk supply in the diets showed that whenever a pint or more of milk per adult-male calcium unit was used daily, the calcium requirement was met."

The work of Bunting, J. and Hard (1) on the effect of a well-balanced diet on the control of dental caries clearly shows the possibilities of an adequate diet. Children from two orphanages served as subjects for comparing the effects of diet and a mouth wash on the teeth. Other children using the mouth wash only served as controls. The diet consisted of one quart of milk and some green vegetables and fruits daily while the sugar was limited to that used in cooking--then only enough to make the food palatable.

According to these authors, "The data obtained from this experiment showed very clearly that in the two groups of children, active dental caries were almost completely arrested by the dietary and therapeutic measures employed and that, during the year of observation, this very prevalent dental disease was made almost negligible in its occurrence. It appears that of the two methods employed, diet was by far the most active inhibitive force, but it will require other controlled experiments to determine just what parts diet and therapeutic remedies severally play in the prevention of dental caries."

Such studies as these show the importance of diet in the development of a health program.

## PROCEDURE

At the beginning of the dietary study each of the eleven Fitter Families serving as subjects was visited personally to secure cooperation. Data were then collected by the investigator for one month for each family. These were secured by making a carefully weighed inventory of all food on hand at the start and again at the end of the experiment. Blanks, a sample of which is seen on page 12, were used to permit of quick and accurate recording of data. In addition to the above information, during the month of this study the house wife kept a record of the weights and cost of all food purchased. On special blanks provided for the purpose she also kept records of all food given away, all food given to the family, the number of guests in the home and of the meals and food eaten outside the home. By means of a questionnaire information was secured regarding the food habits of the individual members of the family.

The data thus collected were analyzed for cost, Calories, protein, calcium, phosphorus, and iron. The vitamin content of the diets was also considered as well as the general food habits of the individuals.

Calculations were made by the use of Rose's Laboratory Handbook for Dietetics and Bradley's Tables of Food Values. A. P. (as purchased) values were used to allow for ordinary





# QUESTIONNAIRE

Name	:	:	:	:
Age	:	:	:	:
Occupation	:	:	:	:
Weight	:	:	:	:
Height	:	:	:	:
1. Do you eat breakfast?	:	:	:	:
2. What do you eat between meals?	:	:	:	:
3. How often do you eat cereals?	:	:	:	:
4. Do you eat a hot or cold breakfast food?	:	:	:	:
5. Do you eat a fruit every day?	:	:	:	:
6. How many cups of coffee do you drink daily?	:	:	:	:
7. How many cups of tea do you drink daily?	:	:	:	:
8. How many glasses of milk do you drink daily?	:	:	:	:
9. How often do you eat meat?	:	:	:	:
10. How often do you eat eggs?	:	:	:	:
11. How often do you eat potatoes?	:	:	:	:
12. How often do you eat leafy vegetables?	:	:	:	:
13. How often do you eat tomatoes?	:	:	:	:
14. How often do you eat citrous fruit?	:	:	:	:
15. How often do you eat whole wheat bread?	:	:	:	:
16. How many glasses of water do you drink daily?	:	:	:	:
17. What vegetables do you eat raw?	:	:	:	:
18. Are you in the habit of missing meals?	:	:	:	:
19. Do you have a good appetite?	:	:	:	:
20. How many veg's besides potatoes are eaten daily:	:	:	:	:
21. Do you leave a clean plate?	:	:	:	:
22. Are all or most left overs utilized?	:	:	:	:

# GENERAL INFORMATION

Date:	No. meals Outside							Guests		Food Given:		Kind and Amount of Food Eaten Between Meals
	of the Home							Adults	Children	Away	Gifts	
Nov.:	:	:	:	:	:	:	:	:	:	:	:	:
1.	:	:	:	:	:	:	:	:	:	:	:	:
2.	:	:	:	:	:	:	:	:	:	:	:	:
3.	:	:	:	:	:	:	:	:	:	:	:	:
4.	:	:	:	:	:	:	:	:	:	:	:	:
5.	:	:	:	:	:	:	:	:	:	:	:	:
6.	:	:	:	:	:	:	:	:	:	:	:	:
7.	:	:	:	:	:	:	:	:	:	:	:	:
8.	:	:	:	:	:	:	:	:	:	:	:	:
9.	:	:	:	:	:	:	:	:	:	:	:	:
10.	:	:	:	:	:	:	:	:	:	:	:	:
11.	:	:	:	:	:	:	:	:	:	:	:	:
12.	:	:	:	:	:	:	:	:	:	:	:	:
13.	:	:	:	:	:	:	:	:	:	:	:	:
14.	:	:	:	:	:	:	:	:	:	:	:	:
15.	:	:	:	:	:	:	:	:	:	:	:	:
16.	:	:	:	:	:	:	:	:	:	:	:	:
17.	:	:	:	:	:	:	:	:	:	:	:	:
18.	:	:	:	:	:	:	:	:	:	:	:	:
19.	:	:	:	:	:	:	:	:	:	:	:	:
20.	:	:	:	:	:	:	:	:	:	:	:	:
21.	:	:	:	:	:	:	:	:	:	:	:	:
22.	:	:	:	:	:	:	:	:	:	:	:	:
23.	:	:	:	:	:	:	:	:	:	:	:	:
24.	:	:	:	:	:	:	:	:	:	:	:	:
25.	:	:	:	:	:	:	:	:	:	:	:	:
26.	:	:	:	:	:	:	:	:	:	:	:	:
27.	:	:	:	:	:	:	:	:	:	:	:	:
28.	:	:	:	:	:	:	:	:	:	:	:	:
29.	:	:	:	:	:	:	:	:	:	:	:	:
30.	:	:	:	:	:	:	:	:	:	:	:	:
31.	:	:	:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:	:	:	:

\* One column for each member of the family.

wastage that was known to occur, but which could not be measured quantitatively. No further allowance was made for waste. In some cases it was necessary to chart recipes to obtain the desired figures.

In order to arrive at the cost of the entire diet it was necessary to attach values to gifts of food and the products raised by each family. The standard market price was placed on these foods.

Pets, such as cats and dogs, were found in a few of the households. The food eaten by these animals was not considered in calculating the diets, since most of them ate table scraps. When special meat was purchased for the dogs, it was omitted in making the inventory.

The average food consumption per man per day was determined by reducing the families to adult-male units using the scale suggested by Hawley (6). The diets were compared as to Calories, protein, calcium, phosphorus, and iron with standards set by Sherman. The percentage distribution as to cost as well as to the above five factors was determined for each food group used, i.e., meat, poultry, and fish; dairy products; fats; sugar and other sweets; vegetables; fruits; grain products; nuts; and miscellaneous.

## TABLE I

## FAMILY A

## COST AND AMOUNTS OF FOOD CONSUMED

Nov. 7 - Dec. 7, 1931, 30 days

FOOD	:CALORIES:	PROTEIN	:CALCIUM:	PHOSPHORUS:	IRON	: COST
	:	gm.	gm.	gm.	gm.	:
Meat, poultry, fish:	44,085:	2,840.66:	1.928:	30.986	: 0.51420	:\$ 9.53
Dairy products	: 51,789:	2,685.81:	77.618:	66.362	: 0.29308	: 9.25
Fats	: 48,914:	45.67:	0.684:	0.775	: 0.00916	: 4.74
Sugars and other	: :	:	:	:	:	:
sweets	: 52,585:	25.11:	0.383:	0.262	: 0.01256	: 2.76
Fruits	: 15,012:	187.24:	6.412:	5.741	: 0.07441	: 6.63
Vegetables	: 24,662:	634.38:	8.783:	17.285	: 0.31667	: 8.60
Grain products	: 69,631:	2,230.52:	12.296:	34.390	: 0.31005	: 5.17
Nuts	: 520:	68.00:	0.063:	0.238	: 0.00185	: 0.15
Miscellaneous	: 3,131:	80.87:	0.381:	2.405	: 0.01036	: 0.93
TOTAL (Gross)	: 309,333:	8,786.36:	108.548:	158.354	: 1.54234	: 47.76
Food not eaten	: -996:	11.90:	0.042:	0.156	: 0.00257	: 0.10
TOTAL (Net)	: 308,337:	8,774.46:	108.506:	158.198	: 1.53977	: 47.66
Per man per day	: 3,615:	91.12:	1.127:	1.643	: 0.01599	: 0.56
Per 3000 Calories	: 3,000:	75.62:	0.935:	1.363	: 0.01327	: 0.45
Per 100 Calories	: 100:	2.52:	0.032:	0.045	: 0.00044	: 0.0150

Adult male units: Energy - 2.4; Protein and Minerals - 2.7.

TABLE I (Continued)

FOOD GROUPS	:CALORIES:	PROTEIN	:CALCIUM	:PHOSPHORUS:	IRON	: COST
	:per cent:	per cent:	per cent:	per cent:	per cent:	per cent
Meat, poultry, fish:	14.3	: 32.3	: 1.8	: 19.6	: 33.3	: 20.0
Dairy products	: 16.7	: 30.6	: 71.5	: 41.9	: 19.0	: 19.4
Fats	: 15.8	: 0.5	: 0.6	: 0.5	: 0.6	: 9.9
Sugars and other	: :	: :	: :	: :	: :	: :
sweets	: 17.0	: 0.3	: 0.4	: 0.2	: 0.8	: 5.8
Fruits	: 4.9	: 2.1	: 5.9	: 3.6	: 4.8	: 13.9
Vegetables	: 8.0	: 7.2	: 8.9	: 10.9	: 20.5	: 18.0
Grain products	: 22.5	: 25.4	: 11.3	: 21.7	: 20.1	: 10.8
Nuts	: 0.2	: 0.8	: 0.1	: 0.2	: 0.1	: 0.3
Miscellaneous	: 1.0	: .9	: 0.4	: 1.5	: 0.7	: 1.9



## TABLE II

## FAMILY B

## COST AND AMOUNTS OF FOOD CONSUMED

Nov. 16 - Dec. 16, 1931 (30 days)

FOOD	:CALORIES:	PROTEIN	:CALCIUM:	PHOSPHORUS:	IRON	: COST
	:	gm.	gm.	gm.	gm.	:
Meat, poultry, fish:	17,810	1,137.62	1.111	12.798	0.20776	\$ 3.50
Dairy products	:159,475	: 5,540.27	:185.929	:149.025	: 0.47184	: 15.03
Fats	: 46,482	: 39.10	: 0.497	: 0.663	: 0.00826	: 3.12
Sugar and other sweets	:	:	:	:	:	:
	: 28,869	: 84.46	: 2.052	: 0.670	: 0.07450	: 1.57
Fruits	: 37,695	: 276.05	: 8.080	: 9.576	: 0.18845	: 5.38
Vegetables	: 52,405	: 1,804.25	:18.907	:42.627	: 0.60298	: 7.58
Grain products	:144,238	: 4,532.83	:12.190	:64.949	: 0.62918	: 4.65
Nuts	: 2,548	: 115.36	: 0.329	: 1.806	: 0.00915	: 0.36
Miscellaneous	: 8,526	: 324.41	: 3.646	: 8.434	: 0.03156	: 2.07
TOTAL (Gross)	:497,418	:13,815.25	:232.741	:290.548	: 2.22368	: 43.26
Food not eaten	: 14,501	: 300.12	: 3.907	: 6.151	: 0.18407	: 4.20
TOTAL (Net)	:437,005	:13,515.13	:228.834	:284.397	: 2.03961	: 39.06
Per man per day	: 3,245	: 90.10	: 1.526	: 1.896	: 0.01360	: 0.32
Per 3000 Calories	: 3,000	: 83.30	: 1.411	: 1.753	: 0.01257	: 0.30
Per 100 Calories	: 100	: 2.78	: 0.047	: 0.058	: 0.00042	: 0.0100

Adult male units: Energy - 4.9; Protein and Minerals - 5.5.

TABLE II (Continued)

FOOD GROUPS	:CALORIES:	PROTEIN	:CALCIUM	:PHOSPHORUS:	IRON	: COST
	:per cent:	per cent:	per cent:	per cent:	per cent:	per cent
Meat, poultry, fish:	3.6	: 8.2	: 0.5	: 4.4	: 9.3	: 8.1
Dairy products	: 32.1	: 40.1	: 79.9	: 51.3	: 21.2	: 34.7
Fats	: 9.3	: 0.3	: 0.2	: 0.2	: 0.4	: 7.2
Sugars and other	: :	: :	: :	: :	: :	: :
sweets	: 5.8	: 0.6	: 0.9	: 0.2	: 3.4	: 3.6
Fruits	: 7.6	: 2.0	: 3.5	: 3.3	: 8.5	: 12.4
Vegetables	: 10.5	: 13.1	: 8.1	: 14.7	: 27.1	: 17.5
Grain products	: 29.0	: 32.8	: 5.2	: 22.4	: 28.3	: 10.7
Nuts	: 0.5	: 0.8	: 0.1	: 0.6	: 0.4	: 0.8
Miscellaneous	: 1.7	: 2.3	: 1.6	: 2.9	: 1.4	: 4.8

## TABLE III

## FAMILY C

## COST AND AMOUNTS OF FOOD CONSUMED

Nov. 23 - Dec. 23, 1931 (30 days)

FOOD	:CALORIES:	PROTEIN	:CALCIUM:	PHOSPHORUS:	IRON	: COST
	:	gm.	gm.	gm.	gm.	:
Meat, poultry, fish:	47,055	4,423.07	2.610	47.235	0.64192	\$13.25
Dairy products	:120,146	: 5,904.75	:186.207	: 152.792	: 0.55854	: 19.45
Fats	: 74,257	: 66.10	: 0.990	: 1.121	: 0.01325	: 5.85
Sugar and other sweets	:108,747	: 220.95	: 7.942	: 3.887	: 0.31670	: 5.76
Fruits	: 41,876	: 353.83	: 7.802	: 11.543	: 0.21535	: 9.26
Vegetables	: 72,123	: 2,322.36	: 21.323	: 56.778	: 0.90654	: 10.49
Grain products	:143,136	: 4,640.77	: 32.516	: 90.306	: 0.70946	: 9.32
Nuts	: 1,110	: 41.74	: 0.350	: 0.478	: 0.00656	: 0.24
Miscellaneous	: 11,673	: 619.17	: 1.898	: 11.840	: 0.17920	: 4.17
TOTAL (Gross)	:620,123	:18,592.74	:261.638	: 375.980	: 3.54752	: 77.91
Food not eaten	: 2,854	: 45.91	: 0.174	: 0.556	: 0.00403	: 0.10
TOTAL (Net)	:617,269	:18,546.83	:261.464	: 375.424	: 3.54349	: 77.81
Per man per day	: 3,054	: 70.65	: 0.996	: 1.430	: 0.01350	: 0.39
Per 3000 Calories	: 3,000	: 69.40	: 0.978	: 1.405	: 0.01326	: 0.37
Per 100 Calories	: 100	: 2.31	: 0.033	: 0.047	: 0.00044	: 0.0123

Adult male units: Energy - 6.3; Protein and Mineral - 8.3.



TABLE III (Continued)

FOOD GROUPS	:CALORIES:	PROTEIN	:CALCIUM	:PHOSPHORUS:	IRON	: COST
	:per cent:	per cent:	per cent:	per cent:	per cent:	per cent
Meat, poultry, fish:	7.6	: 23.8	: 1.0	: 12.6	: 18.1	: 17.0
Dairy products	: 19.4	: 31.8	: 71.2	: 40.6	: 15.7	: 25.0
Fats	: 12.0	: 0.4	: 0.4	: 0.3	: 0.4	: 7.6
Sugars and other	: :	: :	: :	: :	: :	: :
sweets	: 17.5	: 1.2	: 3.0	: 1.0	: 8.9	: 7.4
Fruits	: 6.7	: 1.9	: 3.0	: 3.1	: 6.7	: 11.9
Vegetables	: 11.7	: 12.5	: 8.1	: 15.1	: 25.6	: 13.5
Grain products	: 23.1	: 25.0	: 12.4	: 24.0	: 20.0	: 12.0
Nuts	: 0.2	: 0.2	: 0.1	: 0.1	: 0.2	: 0.3
Miscellaneous	: 1.9	: 3.3	: 0.7	: 3.1	: 5.1	: 5.4

## TABLE IV

## FAMILY D

## COST AND AMOUNTS OF FOOD CONSUMED

Dec. 7, 1931.- Jan. 7, 1932 (31 days)

FOOD	:CALORIES:	PROTEIN	:CALCIUM:	PHOSPHORUS:	IRON	: COST
	:	gm.	gm.	gm.	gm.	:
Meat, poultry, fish:	37,130	:2,230.30:	1.395:	23.892	: 0.29245	:\$ 7.03
Dairy products	: 43,793	:2,542.89:	71.286:	62.189	: 0.27932	: 7.34
Fats	: 33,575	: 39.24:	0.260:	0.341	: 0.00434	: 1.68
Sugars and other	:	:	:	:	:	:
sweets	: 47,220	: --	: 0.616:	0.411	: 0.02055	: 4.51
Fruits	: 24,233	: 207.18:	6.568:	7.533	: 0.15368	: 6.08
Vegetables	: 28,290	: 946.23:	9.911:	24.537	: 0.40350	: 5.96
Grain products	: 74,439	:2,272.67:	13.274:	34.097	: 0.29625	: 5.78
Nuts	: 10,462	: 382.83:	1.518:	5.190	: 0.03915	: 0.75
Miscellaneous	: 9,278	: 303.11:	0.610:	2.772	: 0.00758	: 2.21
TOTAL (Gross)	:311,420	:8,924.45:	105.438:	160.962	: 1.49682	: 41.34
Food not eaten	: 5,000	: 139.61:	1.767:	4.682	: 0.05785	: 0.51
TOTAL (Net)	:306,420	:8,784.84:	103.671:	156.280	: 1.43897	: 40.83
Per man per day	: 3,526	: 85.29:	1.007:	1.517	: 0.01397	: 0.47
Per 3000 Calories	: 3,000	: 72.57:	0.857:	1.291	: 0.01189	: 0.45
Per 100 Calories	: 100	: 2.42:	0.029:	0.043	: 0.00040	: 0.0015

Adult male units: Energy - 2.6; Protein and Minerals - 3.1.

TABLE IV (Continued)

FOOD GROUPS	:CALORIES:	PROTEIN	:CALCIUM	:PHOSPHORUS:	IRON	: COST
	:per cent:	per cent:	per cent:	per cent:	per cent:	per cent
Meat, poultry, fish:	11.9	: 25.0	: 1.3	: 14.8	: 19.5	: 17.4
Dairy products	: 14.1	: 28.5	: 67.6	: 38.6	: 18.7	: 18.2
Fats	: 10.8	: 0.4	: 0.2	: 0.2	: 0.3	: 4.2
Sugars and other	: :	: :	: :	: :	: :	: :
sweets	: 15.2	: --	: 0.6	: 0.3	: 1.4	: 11.2
Fruits	: 8.7	: 2.3	: 6.2	: 4.7	: 10.3	: 15.1
Vegetables	: 9.1	: 10.6	: 9.4	: 15.2	: 27.0	: 14.8
Grain products	: 24.0	: 25.5	: 12.6	: 21.2	: 19.8	: 14.3
Nuts	: 3.4	: 4.3	: 1.4	: 3.2	: 2.6	: 1.9
Miscellaneous	: 3.0	: 3.4	: 0.6	: 1.7	: 0.5	: 5.5

## TABLE V

## FAMILY E

## COST AND AMOUNTS OF FOOD CONSUMED

Dec. 12, 1931 - Jan. 12, 1932 (31 days)

FOOD	:CALORIES:	PROTEIN	:CALCIUM:	PHOSPHORUS:	IRON	: COST
	:	gm.	gm.	gm.	gm.	:
Meat, poultry, fish:	32,719	:2,232.70:	2.385:	24.596	: 0.32689	:\$ 6.57
Dairy products	: 43,084	:1,903.82:	55.424:	46.847	: 0.19930	: 6.15
Fats	: 17,437	: 18.44:	0.276:	0.313	: 0.00370	: 1.22
Sugars and other	:	:	:	:	:	:
sweets	: 47,520	: 28.49:	0.208:	0.304	: 0.01887	: 2.21
Fruits	: 19,962	: 227.51:	6.616:	6.373	: 0.11115	: 4.60
Vegetables	: 10,148	: 318.86:	4.925:	8.470	: 0.46045	: 3.18
Grain products	: 52,182	:1,679.60:	5.987:	18.851	: 0.15417	: 3.47
Nuts	: 5,592	: 82.26:	0.522:	1.947	: 0.01638	: 0.86
Miscellaneous	: 5,670	: 2.37:	0.006:	0.048	: 0.00020	: 0.71
TOTAL (Gross)	:293,541	:6,494.05:	76.349:	107.749	: 1.29111	: 28.97
Food not eaten	: 12,142	: 103.36:	0.663:	1.443	: 0.01653	: 0.60
TOTAL (Net)	:281,399	:6,390.69:	75.686:	106.306	: 1.27458	: 28.37
Per man per day	: 3,368	: 69.27:	0.820:	1.152	: 0.01382	: 0.35
Per 3000 Calories	: 3,000	: 61.70:	0.730:	1.026	: 0.01231	: 0.30
Per 100 Calories	: 100	: 2.06:	0.024:	0.034	: 0.00041	: 0.0100

Adult male units: Energy - 2.6; Protein and Minerals - 3.0.

TABLE V (Continued)

FOOD GROUPS	:CALORIES:	PROTEIN	:CALCIUM	:PHOSPHORUS:	IRON	: COST
	:per cent:	per cent:	per cent:	per cent:	per cent:	per cent
Meat, poultry, fish:	11.1	: 34.4	: 3.1	: 22.8	: 25.3	: 22.7
Dairy products	: 14.7	: 29.3	: 72.6	: 43.5	: 15.4	: 21.2
Fats	: 5.9	: 0.3	: 0.4	: 0.3	: 0.3	: 4.2
Sugar and other	: :	: :	: :	: :	: :	: :
sweets	: 16.2	: 0.4	: 0.3	: 0.3	: 1.5	: 7.6
Fruits	: 6.8	: 3.5	: 8.7	: 5.9	: 8.6	: 15.9
Vegetables	: 3.5	: 4.9	: 6.5	: 7.9	: 35.7	: 11.0
Grain products	: 17.8	: 25.9	: 7.8	: 17.5	: 11.9	: 12.0
Nuts	: 1.9	: 1.3	: 0.7	: 1.8	: 1.3	: 3.0
Miscellaneous	: 1.9	: 0.0	: 0.0	: 0.0	: 0.0	: 2.5

## TABLE VI

## FAMILY F

## COST AND AMOUNTS OF FOOD CONSUMED

Dec. 31, 1931 - Jan. 30, 1932 (30 days)

FOOD	:CALORIES:	PROTEIN	:CALCIUM:	PHOSPHORUS:	IRON	: COST
		gm.	gm.	gm.	gm.	
Meat, poultry, fish:	49,745	2,465.64:	1.431:	26.577	0.36625	\$ 8.32
Dairy products	77,920	4,455.99:	122.557:	106.578	0.50554	12.47
Fats	59,326	28.07:	0.420:	0.476	0.00563	3.67
Sugars and other						
sweets	88,344	17.92:	0.412:	0.380	0.02206	4.34
Fruits	34,521	263.12:	7.637:	8.325	0.15045	7.41
Vegetables	31,221	1,009.04:	7.794:	23.030	0.36340	4.79
Grain products	144,984	4,621.65:	19.480:	52.902	0.50764	7.86
Nuts	41,797	982.82:	4.645:	20.518	0.15489	4.84
Miscellaneous	14,362	255.77:	1.631:	8.326	0.04697	2.80
TOTAL (Gross)	542,220	1,410.02:	166.007:	247.112	2.12283	56.50
Food given away	-567	2.72:	0.122:	0.236	0.00680	0.10
TOTAL (Net)	541,653	1,407.30:	165.885:	246.876	2.11603	56.40
Per man per day	3,983	79.06:	0.932:	1.387	0.01189	0.41
Per 3000 Calories	3,000	59.55:	0.702:	1.045	0.00896	0.31
Per 100 Calories	100	1.99:	0.023:	0.035	0.00299	0.0103

Adult male units: Energy - 4.6; Protein and Minerals - 6.0.

TABLE VI (Continued)

FOOD GROUPS	:CALORIES:	PROTEIN	:CALCIUM	:PHOSPHORUS:	IRON	: COST
	:per cent:	per cent:	per cent:	per cent	:per cent:	per cent
Meat, poultry, fish:	9.2	: 17.5	: 0.9	: 10.8	: 17.3	: 14.7
Dairy products	: 14.4	: 31.6	: 73.8	: 43.1	: 23.8	: 22.1
Fats	: 10.9	: 0.2	: 0.3	: 0.2	: 0.3	: 6.5
Sugars and other	: :	: :	: :	: :	: :	: :
sweets	: 16.3	: 0.1	: 0.2	: 0.2	: 1.0	: 7.7
Fruits	: 6.4	: 1.9	: 4.6	: 3.4	: 7.1	: 13.1
Vegetables	: 5.8	: 7.2	: 4.7	: 9.3	: 17.1	: 8.5
Grain products	: 26.7	: 32.8	: 11.7	: 21.4	: 23.9	: 13.9
Nuts	: 7.7	: 7.0	: 2.8	: 8.3	: 7.3	: 8.6
Miscellaneous	: 2.6	: 1.8	: 1.0	: 3.4	: 2.2	: 5.0



## TABLE VII

## FAMILY G

## COST AND AMOUNTS OF FOOD CONSUMED

Dec. 29, 1931 - Jan. 29, 1932 (31 days)

FOOD	:CALORIES:	PROTEIN	:CALCIUM:	PHOSPHORUS:	IRON	: COST
	:	gm.	gm.	gm.	gm.	:
Meat, poultry, fish:	45,215	2,791.78:	0.172:	30.237	0.39690	:\$ 4.26
Dairy products	:105,440	: 5,335.25:	179.248:	142.324	: 0.43570	: 10.36
Fats	: 39,588	: 46.15:	0.068:	0.077	: 0.00091	: 1.35
Sugars and other	:	:	:	:	:	:
sweets	: 73,087	: 5.44:	0.557:	0.176	: 0.01826	: 2.93
Fruits	: 39,242	: 346.64:	8.960:	10.540	: 0.19176	: 6.09
Vegetables	: 43,456	: 1,363.45:	15.316:	33.793	: 0.53795	: 5.53
Grain products	:120,961	: 3,898.00:	10.477:	51.085	: 0.53255	: 3.74
Nuts	: 8,398	: 238.28:	1.091:	4.446	: 0.03117	: 0.56
Miscellaneous	: 7,126	: 270.25:	0.130:	6.750	: 0.02722	: 2.30
TOTAL (Gross)	:482,513	:14,295.24:	216.019:	279.428	: 2.17242	: 37.12
Food not eaten	: -1,727	: 23.48:	0.133:	1.109	: 0.00627	: 0.15
TOTAL (Net)	:480,796	:14,251.76:	215.886:	278.319	: 2.16615	: 36.97
Per man per day	: 3,662	: 98.22:	1.487:	1.918	: 0.01493	: 0.28
Per 3000 Calories	: 3,000	: 80.46:	1.218:	1.571	: 0.01122	: 0.23
Per 100 Calories	: 100	: 2.68:	0.041:	0.052	: 0.00037	: 0.0077

Adult male units: Energy - 4.6; Protein and Minerals - 5.2.



TABLE VII (Continued)

FOOD GROUPS	:CALORIES:	PROTEIN	:CALCIUM	:PHOSPHORUS:	IRON	: COST
	:per cent:	per cent:	per cent:	per cent:	per cent:	per cent
Meat, poultry, fish:	9.4	: 19.5	: 0.1	: 10.8	: 18.3	: 11.5
Dairy products	: 21.9	: 37.3	: 83.0	: 50.9	: 20.1	: 27.9
Fats	: 8.2	: 0.3	: 0.0	: 0.0	: 0.0	: 3.6
Sugars and other	: :	: :	: :	: :	: :	: :
sweets	: 15.1	: 0.0	: 0.3	: 0.0	: 0.8	: 7.9
Fruits	: 8.1	: 2.4	: 4.1	: 3.8	: 8.8	: 16.4
Vegetables	: 9.0	: 9.5	: 7.1	: 12.1	: 24.8	: 14.9
Grain products	: 25.1	: 27.2	: 4.9	: 18.3	: 24.5	: 10.1
Nuts	: 1.7	: 1.7	: 0.5	: 1.6	: 1.4	: 1.5
Miscellaneous	: 1.5	: 1.9	: 0.1	: 2.4	: 1.3	: 6.2

## TABLE VIII

## FAMILY H

## COST AND AMOUNTS OF FOOD CONSUMED

Dec. 30, 1931 - Jan. 30, 1932 (31 days)

FOOD	:CALORIES:	PROTEIN	:CALCIUM:	PHOSPHORUS:	IRON	: COST
		gm.	gm.	gm.	gm.	
Meat, poultry, fish:	20,995	1,667.19	1.400	19.205	0.30651	\$ 6.13
Dairy products	94,801	4,520.80	156.404	123.120	0.35649	14.32
Fats	32,289	24.40	0.366	0.414	0.00489	3.07
Sugars and other						
sweets	53,396	34.02	0.120	1.225	0.03374	2.00
Fruits	16,251	143.96	5.395	5.329	0.10902	4.32
Vegetables	19,656	594.02	8.461	75.391	0.47063	7.04
Grain products	72,734	2,510.66	15.289	45.340	0.46638	5.54
Nuts	19,625	948.13	2.604	14.615	0.07305	1.09
Miscellaneous	3,369	84.51	1.200	1.310	0.00781	0.86
TOTAL (Gross)	333,116	10,527.69	191.239	285.949	1.82852	44.37
Food not eaten	1,411	32.54	0.981	0.966	0.00457	0.22
TOTAL (Net)	331,705	10,495.15	191.658	284.983	1.82395	44.15
Per man per day	3,690	74.86	1.367	2.033	0.01301	0.44
Per 3000 Calories	3,000	60.86	1.111	1.870	0.01058	0.35
Per 100 Calories	100	2.29	0.037	0.062	0.00035	0.0117

Adult male units: Energy - 2.9; Protein and Minerals - 4.2.

TABLE VIII (Continued)

FOOD GROUPS	:CALORIES:	PROTEIN	:CALCIUM	:PHOSPHORUS:	IRON	: COST
	:per cent:	per cent:	per cent:	per cent:	per cent:	per cent
Meat, poultry, fish:	6.3	: 15.8	: 0.7	: 6.7	: 16.8	: 13.8
Dairy products	: 28.5	: 42.9	: 81.8	: 43.1	: 19.5	: 32.3
Fats	: 9.7	: 0.2	: 0.2	: 0.1	: 0.3	: 6.9
Sugars and other	: :	: :	: :	: :	: :	: :
sweets	: 16.0	: 0.3	: 0.1	: 0.4	: 1.8	: 4.5
Fruits	: 4.9	: 1.4	: 2.8	: 1.9	: 6.0	: 9.7
Vegetables	: 5.9	: 5.6	: 4.4	: 26.4	: 25.7	: 15.9
Grain products	: 21.8	: 23.8	: 8.0	: 15.9	: 25.5	: 12.5
Nuts	: 5.9	: 9.0	: 1.4	: 5.1	: 4.0	: 2.5
Miscellaneous	: 1.0	: 0.8	: 0.6	: 0.5	: 0.4	: 1.9

## TABLE IX

## FAMILY I

## COST AND AMOUNTS OF FOOD CONSUMED

Jan. 14 - Feb. 13, 1932 (30 days)

FOOD	:CALORIES:	PROTEIN	:CALCIUM:	PHOSPHORUS:	IRON	: COST
	:	gm.	gm.	gm.	gm.	:
Meat, poultry, fish:	42,696	: 2,991.39:	2.006:	32.436	: 0.50314	:\$ 5.03
Dairy products	: 75,598	: 3,750.81:	124.894:	99.660	: 0.31416	: 9.24
Fats	: 46,623	: 64.29:	0.814:	1.487	: 0.02124	: 2.61
Sugars and other	:	:	:	:	:	:
sweets	: 49,961	: 70.66:	2.772:	1.081	: 0.10327	: 2.99
Fruits	: 18,452	: 177.02:	4.728:	6.186	: 0.10085	: 5.46
Vegetables	: 30,291	: 1,221.73:	13.270:	28.244	: 0.51400	: 1.57
Grain products	: 63,381	: 1,349.19:	11.354:	46.688	: 0.37741	: 3.38
Nuts	: 10,914	: 417.58:	1.554:	6.477	: 0.07011	: 0.81
Miscellaneous	: 12,377	: 375.71:	1.301:	3.782	: 0.04728	: 1.81
TOTAL (Gross)	:350,293	:10,418.38:	162.693:	226.041	: 2.05146	: 32.90
Food not eaten	: 17,641	: 382.07:	4.015:	5.742	: 0.11754	: 1.10
TOTAL (Net)	:332,652	:10,036.31:	158.678:	220.299	: 1.93392	: 31.80
Per man per day	: 2,704	: 61.95:	0.980:	1.360	: 0.01194	: 0.26
Per 3000 Calories	: 3,000	: 68.70:	1.087:	1.472	: 0.01325	: 0.29
Per 100 Calories	: 100	: 2.26:	0.362:	0.049	: 0.00044	: 0.0099

Adult male units: Energy - 4.0; Protein and Minerals - 5.3.

TABLE IX (Continued)

FOOD GROUPS	:CALORIES:	PROTEIN	:CALCIUM	:PHOSPHORUS:	IRON	: COST
	:per cent:	per cent:	per cent:	per cent:	per cent:	per cent
Meat, poultry, fish:	12.2	: 28.7	: 1.2	: 14.3	: 24.5	: 15.3
Dairy products	: 21.6	: 36.0	: 76.8	: 44.1	: 15.3	: 28.1
Fats	: 13.3	: 0.6	: 0.5	: 0.6	: 1.0	: 7.9
Sugars and other	: :	: :	: :	: :	: :	: :
sweets	: 14.3	: 0.7	: 1.7	: 0.5	: 5.0	: 9.1
Fruits	: 5.3	: 1.7	: 2.9	: 2.7	: 4.9	: 16.6
Vegetables	: 8.6	: 11.7	: 8.2	: 12.4	: 25.1	: 4.8
Grain products	: 18.1	: 13.0	: 7.0	: 20.7	: 18.4	: 10.3
Nuts	: 3.1	: 4.0	: 1.0	: 2.9	: 3.4	: 2.5
Miscellaneous	: 3.5	: 3.6	: 0.8	: 1.7	: 2.3	: 5.5

## TABLE X

## FAMILY J

## COST AND AMOUNTS OF FOOD CONSUMED

Feb. 6 - Mch. 7, 1932 (30 days)

FOOD	:CALORIES:	PROTEIN	:CALCIUM:	PHOSPHORUS:	IRON	: COST
	:	gm.	: gm.	: gm.	: gm.	:
Meat, poultry, fish:	27,580:	1,707.84:	1.165:	19.504	: 0.27377	:\$ 5.34
Dairy products	: 87,837:	4,242.19:	112.323:	98.725	: 0.49198	: 12.72
Fats	: 42,926:	46.05:	0.615:	0.979	: 0.01341	: 2.66
Sugars and other	: :	:	:	:	:	:
sweets	: 27,277:	20.42:	0.618:	1.256	: 0.03381	: 2.44
Fruits	: 20,089:	194.90:	6.271:	5.757	: 0.11350	: 4.63
Vegetables	: 12,942:	440.01:	7.143:	11.096	: 0.23875	: 4.72
Grain products	: 67,205:	2,172.00:	10.277:	54.209	: 0.47214	: 4.48
Nuts	: 6,674:	235.03:	0.860:	4.248	: 0.02428	: 0.71
Miscellaneous	: 6,393:	204.19:	1.606:	2.049	: 0.01637	: 1.72
TOTAL (Gross)	: 298,923:	9,262.63:	140.878:	197.823	: 1.82534	: 39.42
Food not eaten	: 1,372:	66.12:	0.278:	0.675	: 0.00690	: 0.23
TOTAL (Net)	: 297,551:	9,196.51:	140.600:	197.148	: 1.81844	: 39.19
Per man per day	: 3,546:	102.53:	1.567:	2.198	: 0.02027	: 0.47
Per 3000 Calories	: 3,000:	86.74:	1.326:	1.860	: 0.01715	: 0.40
Per 100 Calories	: 100:	2.89:	0.044:	0.062	: 0.00057	: 0.0133

Adult male units: Energy - 3.4; Protein and Minerals - 3.7.

TABLE X (Continued)

FOOD GROUPS	:CALORIES:	PROTEIN	:CALCIUM	:PHOSPHORUS:	IRON	: COST
	:per cent:	per cent:	per cent:	per cent:	per cent:	per cent
Meat, poultry, fish:	9.2	: 18.4	: 0.8	: 9.9	: 15.0	: 13.5
Dairy products	: 29.4	: 45.8	: 79.7	: 49.9	: 27.0	: 32.3
Fats	: 14.3	: 0.5	: 0.4	: 0.5	: 0.7	: 6.7
Sugars and other	: :	: :	: :	: :	: :	: :
sweets	: 9.1	: 0.2	: 0.4	: 0.6	: 1.9	: 6.2
Fruits	: 6.7	: 2.1	: 4.5	: 2.9	: 6.2	: 11.7
Vegetables	: 4.3	: 4.8	: 5.1	: 5.6	: 13.1	: 12.0
Grain products	: 22.5	: 23.4	: 7.3	: 27.4	: 25.9	: 11.4
Nuts	: 2.2	: 2.5	: 0.6	: 2.1	: 0.1	: 1.8
Miscellaneous	: 2.1	: 2.2	: 1.1	: 1.0	: 0.9	: 4.4



TABLE XI  
FAMILY K

COST AND AMOUNTS OF FOOD CONSUMED

Feb. 27 - Mch. 28, 1932 (30 days)

FOOD	:CALORIES:	PROTEIN	:CALCIUM:	PHOSPHORUS:	IRON	: COST
	:	gm.	gm.	gm.	gm.	:
Meat, poultry, fish:	35,185:	2,228.73:	1.433:	24.800	: 0.33646	:\$ 5.07
Dairy products	: 62,097:	3,501.97:	95.518:	82.860	: 0.39217	: 7.69
Fats	: 74,664:	63.10:	0.825:	0.935	: 0.01105	: 4.86
Sugars and other	: :	:	:	:	:	:
sweets	: 56,419:	85.60:	2.049:	0.990	: 0.08400	: 5.33
Fruits	: 49,225:	466.84:	10.253:	13.280	: 0.20578	: 12.58
Vegetables	: 159,273:	2,006.80:	19.339:	49.477	: 0.88430	: 9.83
Grain products	: 111,712:	3,292.71:	19.891:	54.127	: 0.58451	: 7.51
Nuts	: 14,023:	654.72:	1.885:	10.286	: 0.05638	: 1.16
Miscellaneous	: 2,899:	89.22:	0.452:	0.298	: 0.01101	: 1.02
TOTAL (Gross)	: 565,497:	12,389.69:	151.645:	237.053	: 2.56566	: 55.05
Food not eaten	: -1,262:	36.00:	1.088:	0.888	: 0.00380	: 0.15
TOTAL (Net)	: 564,265:	12,353.69:	150.557:	236.165	: 2.56186	: 54.90
Per man per day	: 4,246:	78.34:	0.955:	1.498	: 0.01625	: 0.41
Per 3000 Calories	: 3,000:	55.35:	0.675:	1.058	: 0.01148	: 0.29
Per 100 Calories	: 100:	1.85:	0.023:	0.033	: 0.00038	: 0.0097

Adult male units: Energy - 4.9; Protein and Mineral - 5.7.



TABLE XI (Continued)

FOOD GROUPS	:CALORIES:	PROTEIN	:CALCIUM	:PHOSPHORUS:	IRON	: COST
	:per cent:	per cent:	per cent:	per cent:	per cent:	per cent
Meat, poultry, fish:	6.2	: 18.0	: 0.9	: 10.5	: 13.1	: 9.2
Dairy products	: 11.0	: 28.3	: 63.0	: 35.0	: 15.3	: 14.0
Fats	: 13.2	: 0.5	: 0.5	: 0.4	: 0.4	: 8.8
Sugars and other	: :	: :	: :	: :	: :	: :
sweets	: 10.0	: 0.7	: 1.4	: 0.4	: 3.3	: 9.7
Fruits	: 8.7	: 3.8	: 6.8	: 5.6	: 8.0	: 22.9
Vegetables	: 28.2	: 16.2	: 12.8	: 20.9	: 34.5	: 17.9
Grain products	: 19.8	: 26.6	: 13.1	: 22.8	: 22.8	: 13.6
Nuts	: 2.5	: 5.3	: 1.2	: 4.3	: 2.2	: 2.1
Miscellaneous	: 0.5	: 0.7	: 0.3	: 0.1	: 0.4	: 1.9

## DISCUSSION OF RESULTS

A good diet supplies three things: (1) ample Calories to yield energy; (2) adequate proteins, minerals and vitamins to provide for growth and maintenance of the body; (3) sufficient vitamins, minerals, and roughage to furnish regulating material.

It has been assumed that the diets of the Fitter Families have included foods that have been adequate for their bodies, judging by their physical and mental rating. The actual food consumption of each of the families included may be seen in Tables I - XI.

It is evident that their diets are better than those of the average family when they are compared with results from other studies.

TABLE XII

COMPARISON OF THE FOOD CONSUMPTION PER MAN PER DAY IN THIS STUDY WITH SHERMAN'S STANDARDS

	:Calo- :ries	:Protein	:Calcium	:Phos- :phorus	:Iron	:Cost
This experiment:	3513	:81.7 gm.	:1.25 gm.	:1.64 gm.	:0.0145 gm.	:\$0.40
Sherman standards	3000	:67.0 gm.	:0.68 gm.	:1.32 gm.	:0.015 gm.	:
Deviation from standard	:+17.9%	:+21.9%	:+81.0%	:+24.2%	: -3.3%	:
No. of diets adequate	: 10	: 10	: 11	: 10	: 3	:

The Calorie consumption ranged from 2704 to 4246 per man per day the average being 3513 Calories which is 17.9% above the commonly accepted standard of 3000 Calories. Only one family was low in Calories and it was not alarmingly so. It is possible that in converting the various members of this group into adult-male units that a too-generous allowance was made for the activity of the man of the house.

As was expected, grain products furnished a large amount of the total Calories, averaging 22.8% in the diets of these groups (Table XIII). This is, however, a lower percentage than is customarily supplied by these foods as is evident when contrasted with the 38.2% found for 244 representative American diets (14). It was rather surprising that an average of 20.3% of the Calories was supplied by dairy products since this is a much higher proportion than the 8.08% reported for the earlier study.

The diets were on the average high in protein ranging from 61.95 to 102.53 grams of protein per man per day, the average being 81.67 grams which is 21.9% above the accepted standard of 67 grams per man per day. It should be noted that 34.7% of the total protein in the diets of the families was supplied by dairy products and 22% by meats, poultry, and fish. More than half of the total protein of these diets was thus furnished by foods known to contain adequate proteins. There seems to be little doubt but that the proteins

were of superior type in all of the diets studied.

Every family studied apparently had an adequate supply of calcium (Table XII). Most of them were much above the standard, the highest being 1.98 grams per man per day while the lowest was 0.82 grams which is considerably above the Sherman recommendation of 0.68 gram per capita daily. The average for the eleven groups was 1.25 grams per man per day which is 81% above the standard. This unusually large amount of calcium was due to the large extent to which dairy products (milk, cream, cheese, and eggs) were used in the diet. From Table XIII it may be seen that 25.1% of the total food expenditures was for dairy products, which supplied on an average 74.6% of the total calcium of the diet. This compares favorably with the 59.4% reported by Sherman (14).

The average phosphorus intake ranged from 2.198 to 1.152 grams with an average of 1.63 grams which is 24.2% above the Sherman recommendation of 1.32 grams per man per day. Dairy products supplied almost one half (43.8%) of the average total phosphorus in the diets. Grain products were the second best source of this element. It is interesting to note that in these studies, meat which is regarded as an excellent source of phosphorus, supplied a comparatively small per cent of the total--only 12.5%. In the Sherman study, meat and grain products both surpassed dairy products as a source of phosphorus.

The daily iron intake ranged from .0203 to .0119 gram with an average of .0145 gram which is only 3.3% below the standard of .015 gram daily per capita. The low iron intake may be explained by the fact that this material represented the food supply of these families during the winter months. At this time of the year many holidays are included which would be apt to result in a higher intake of sweets than customary. It should also be remembered that the supply of fresh vegetables is considerably less during the winter months than in summer. Even under these circumstances the largest amount of iron in the diet was received through the vegetables consumed, which averaged 25.1% of the total iron intake (Table XIII). Meats, dairy products, and grain products also furnished considerable iron to the diet. In the Sherman study meat outranked vegetables supplying 30.37% of the iron, while the latter gave an amount approximately equal to that of this study. Had these families used somewhat more meat, eggs, or whole grain products, doubtless the iron requirement would easily have been met.

The cost of the diet varied from 56 to 26 cents per man per day. The 26-cent diet was slightly inadequate in three factors, i.e., Calories, protein, and iron. They could probably all have been met by a somewhat larger use of whole grain products. The average cost of the three diets adequate in all five factors was 44 cents per capita per day, the



highest being 56 cents and the lowest 28 cents. The 56-cent diet appears high in comparison with some of the others, but account should be taken of the fact that this family consisted of only three members while the one consuming the 28-cent diet was made up of eight people. It should be remembered that it is possible to buy more economically for large numbers. The higher cost may also be explained by the fact that this was the first inventory made and that prices gradually fell during the time of the study which put the first family at a disadvantage from the standpoint of economy. While the 28-cent menu was adequate in all the factors studied it was evident that this diet did not supply as good a variety of foods as the more expensive ones. It does show however that it is possible to have an adequate diet with a small expenditure of money.



TABLE XIII

THE AVERAGE DISTRIBUTION OF THE NUTRITIVE FACTORS  
STUDIED AMONG EACH OF THE FOOD GROUPS

	:Relative:	Calo-	Pro-	Cal-	Phos-	:
	: Cost	:ries	:tein:	:cium:	:phorus:	Iron
	: %	: %	: %	: %	: %	: %
I. Meat, poultry, and fish	: 15.0	: 9.2	:22.0:	1.1:	12.5	:19.1
II. Dairy products:	25.1	:20.3	:34.7:	74.6:	43.8	:19.2
III. Fats	: 6.3	:11.2	: 0.4:	0.3:	0.3	: 0.4
IV. Sugar and other sweets	: 6.4	:13.9	: 0.4:	0.8:	0.4	: 2.7
V. Fruits	: 13.2	: 6.8	: 2.3:	4.8:	3.7	: 7.3
VI. Vegetables	: 15.7	: 9.5	: 9.4:	7.6:	13.7	:25.1
VII. Grain products:	12.5	:22.8	:25.6:	9.2:	21.2	:21.9
VIII. Nuts	: 2.4	: 2.7	: 3.4:	0.9:	2.7	: 2.0
IX. Miscellaneous	: 3.6	: 1.9	: 1.9:	0.7:	1.7	: 1.4

Sherman has made the following rules concerning food expenditures:

1. At least as much should be spent for milk (including cream and cheese) as for meats, poultry, and fish.

2. At least as much should be spent for fruits and vegetables as for meats, poultry, and fish.

From the above table it may be seen that 25.1% of the total food money was spent for dairy products while only 15% was spent for meats, poultry, and fish. The total expenditure for fruits and vegetables was 28.9%. The high percentage spent for dairy products, fresh fruits, and vegetables, and the liberal use of whole grains almost insures

TABLE XIV

## PERCENTAGE DISTRIBUTION OF CALORIES IN THE FOOD GROUP

Family	Meat Poultry	Dairy	Fish	Products	Fats	Sugars & other Sweets	Fruits	Veg.	Grain	Products	Nuts	Misc.
A	14.3	16.7	15.8	17.0	4.9	8.0	22.5	0.2	1.0			
B	3.6	32.1	9.3	5.8	7.6	10.5	29.0	0.5	1.7			
C	7.6	19.4	12.0	17.5	6.7	11.7	23.1	0.2	1.9			
D	11.9	14.1	10.8	15.2	8.7	9.1	24.0	3.4	3.0			
E	11.1	14.7	5.9	16.2	6.8	3.5	17.8	1.9	1.9			
F	9.2	14.4	10.9	16.3	6.4	5.8	26.7	7.7	2.6			
G	9.4	21.9	8.2	15.1	8.1	9.0	25.1	1.7	1.5			
H	6.3	28.5	9.7	16.0	4.9	5.9	21.8	5.9	1.0			
I	12.2	21.6	13.3	14.3	5.3	8.6	18.1	3.1	3.5			
J	9.2	29.4	14.3	9.1	6.7	4.3	22.5	2.2	2.1			
K	6.2	11.0	13.2	10.0	8.7	28.2	19.8	2.5	0.5			
Totals	101.0	223.8	123.4	152.5	74.8	104.6	250.4	29.3	20.7			
Average	9.2	20.3	11.2	13.9	6.8	9.5	22.8	2.7	1.9			

TABLE XV  
PERCENTAGE DISTRIBUTION OF PROTEIN IN THE FOOD GROUPS

Family	Meat : Poultry : Fish	Dairy : Products	Fats	Sugars : & other : Sweets	Fruits	Veg.	Grain : Products	Nuts	Misc.
A	32.3	30.6	0.5	0.3	2.1	7.2	25.4	0.8	0.9
B	8.2	40.1	0.3	0.6	2.0	13.1	32.8	0.8	2.3
C	23.8	31.8	0.4	1.2	1.9	12.5	25.0	0.2	3.3
D	25.0	28.5	0.4	0.0	2.3	10.6	25.5	4.3	3.4
E	34.4	29.3	0.3	0.4	3.5	4.9	25.9	1.3	0.0
F	17.5	31.6	0.2	0.1	1.9	7.2	32.8	7.0	1.8
G	19.5	37.3	0.3	0.0	2.4	9.5	27.2	1.7	1.9
H	15.8	42.9	0.2	0.3	1.4	5.6	23.8	9.0	0.8
I	28.7	36.0	0.6	0.7	1.7	11.7	13.0	4.0	3.6
J	18.4	45.8	0.5	0.2	2.1	4.8	23.4	2.5	2.2
K	18.0	28.3	0.5	0.7	3.8	16.2	26.6	5.3	0.7
Totals	241.6	382.2	4.2	4.5	25.1	103.3	281.4	36.9	20.9
Average	22.0	34.7	0.4	0.4	2.3	9.4	25.6	3.4	1.9

TABLE XVI  
PERCENTAGE DISTRIBUTION OF CALCIUM IN THE FOOD GROUPS

Family	Fish	Meat : Poultry	Dairy : Products	Fats	Sugars : & other	Sweets	Fruits	Veg.	Grain	Nuts	Misc.
A	1.8	71.5	0.6	0.4	5.9	8.9	11.3	0.1	0.4		
B	0.5	79.9	0.2	0.9	3.5	8.1	5.2	0.1	1.6		
C	1.0	71.2	0.4	3.0	3.0	8.1	12.4	0.1	0.7		
D	1.3	67.6	0.2	0.6	6.2	9.4	12.6	1.4	0.6		
E	3.1	72.6	0.4	0.3	8.7	6.5	7.8	0.7	0.0		
F	0.9	73.8	0.3	0.2	4.6	4.7	11.7	2.8	1.0		
G	0.1	83.0	0.0	0.3	4.1	7.1	4.9	0.5	0.1		
H	0.7	81.8	0.2	0.1	2.8	4.4	8.0	1.4	0.6		
I	1.2	76.8	0.5	1.7	2.9	8.2	7.0	1.0	0.8		
J	0.8	79.7	0.4	0.4	4.5	5.1	7.3	0.6	1.1		
K	0.9	63.0	0.5	1.4	6.8	12.8	13.1	1.2	0.3		
Totals	12.3	820.9	3.7	9.3	53.0	83.3	101.3	9.9	7.2		
Average	1.1	74.6	0.3	0.8	4.8	7.6	9.2	0.9	0.7		

TABLE XVII

## PERCENTAGE DISTRIBUTION OF PHOSPHORUS IN THE FOOD GROUPS

Family	Meat : Poultry : Fish	Dairy : Products	Fats : Fats	Sugars : & other : Sweets	Fruits : Fruits	Veg. : Veg.	Grain : Grain	Products : Products	Nuts : Nuts	Misc. : Misc.
A	19.6	41.9	0.5	0.2	3.6	10.9	21.7	0.2	1.5	
B	4.4	51.3	0.2	0.2	3.3	14.7	22.4	0.6	2.9	
C	12.6	40.6	0.3	1.0	3.1	15.1	24.0	0.1	3.1	
D	14.8	38.6	0.2	0.3	4.7	15.2	21.2	3.2	1.7	
E	22.8	43.5	0.3	0.3	5.9	7.9	17.5	1.8	0.0	
F	10.8	43.1	0.2	0.2	3.4	9.3	21.4	8.3	3.4	
G.	10.8	50.9	0.0	0.0	3.8	12.1	18.3	1.6	2.4	
H	6.7	43.1	0.1	0.4	1.9	26.4	15.9	5.1	0.5	
I	14.3	44.1	0.6	0.5	2.7	12.4	20.7	2.9	1.7	
J	9.9	49.9	0.5	0.6	2.9	5.6	27.4	2.1	1.0	
K.	10.5	35.0	0.4	0.4	5.6	20.9	22.8	4.3	0.1	
Totals	137.2	482.0	3.3	4.1	40.9	150.5	233.3	30.2	18.3	
Average	12.5	43.8	0.3	0.4	3.7	13.7	21.2	2.7	1.7	

TABLE XVIII  
PERCENTAGE DISTRIBUTION OF IRON IN THE FOOD GROUPS

Family	Meat	Poultry	Dairy	Fish	Products	Fats	Sugars	& other	Sweets	Fruits	Veg.	Grain	Products	Nuts	Misc.
A	33.3		19.0		0.6	0.8	4.8	20.5	20.1	0.1	0.7				
B	9.3		21.2		0.4	3.4	8.5	27.1	28.3	0.4	1.4				
C	18.1		15.7		0.4	8.9	6.7	25.6	20.0	0.2	5.1				
D	19.5		18.7		0.3	1.4	10.3	27.0	19.8	2.6	0.5				
E	25.3		15.4		0.3	1.5	8.6	35.7	11.9	1.3	0.0				
F	17.3		23.8		0.3	1.0	7.1	17.1	23.9	7.3	2.2				
G	18.3		20.1		0.0	0.8	8.8	24.8	24.5	1.4	1.3				
H	16.8		19.5		0.3	1.8	6.0	25.7	25.5	4.0	0.4				
I	24.5		15.3		1.0	5.0	4.9	25.1	18.4	3.4	2.3				
J	15.0		27.0		0.7	1.9	6.2	13.1	25.9	0.1	0.9				
K	13.1		15.3		0.4	3.3	8.0	34.5	22.8	2.2	0.4				
Totals	210.5		211.0		4.7	29.8	79.9	276.2	241.1	23.0	15.2				
Average	19.1		19.2		0.4	2.7	7.3	25.1	21.9	2.0	1.4				



an adequate supply of vitamins A, B, C, and G.

A questionnaire was used to secure certain information concerning the food habits of these eleven families, which included 30 adults and 27 children. It was thus learned that all the groups served breakfast every morning, and all members of each family partook of it except one business girl who often overslept and then missed her breakfast. All families reported very little eating between meals with the exception of fruit. It seemed to be the most popular food for this purpose. Ten families reported the use of breakfast food every morning. Cooked breakfast food appeared to be favored during the winter months and prepared cereals during the summer. The remaining family served breakfast cereals two to four times a week to the parents and twice daily to the year-old child.

Fruit was used extensively in the menus of all these people. It was included every day in their diets, and in nine of these families citrous fruits were used at least once a day. The other two families included them in the diet two to three times a week.

Seventeen of the 30 adults drank coffee daily with an average of a little less than 2 cups a day. The highest consumption for adults was three cups per day and the lowest one cup. No child used coffee. This is unusual for so large a group, especially since several of the children were

of high school age. All the children drank milk, consuming an average of three glasses a day which is an amount frequently recommended. Two children actually drank one quart a day in addition to what they received in their food. Only one child received less than a pint of milk a day, and it had only one glass. While the milk consumption of these children may thus be seen to fall somewhat below the standard of one quart per child per day, it is likely that many had a quart when the milk used in cooking was taken into consideration. All the families used generous amounts of milk in cooking.

Meat was used once each day by seven families. Three families served meat on an average five times a week, and the other one reported its use twice daily, with a meat substitute often taking its place for one of the meals. Only three families served eggs daily in the diet; four served them three times a week, the others once a week with the exception of one family which used them only in cooking. It is of interest to note that the family that consumed by far the greatest amount of eggs during the month was the one which received over 0.020 gram of iron per man per day. A more liberal amount of eggs may be suggested as a means of raising the iron content of the diets of those families found to be low in this essential.

Leafy vegetables were used by nine of the families

every day. The other two families averaged four to five servings a week.

Four of the groups used white bread entirely, four ate whole wheat bread, and the remaining three included both kinds in their diet. All of the families used whole grain breakfast cereals freely.

On the whole, judging from the information obtained in this questionnaire, these families appeared to have good food habits, and to serve well balanced and varied meals.

#### CONCLUSIONS

The diets observed in this study are more adequate than the average, when compared with dietary studies of other groups.

The unusually good quality of their diet is probably a factor contributing to the superior physical and mental fitness of these eleven Fitter Families of Kansas.

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